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ment and fast having whetted their appetites and rendered them exceedingly active in their visits to the flowers. This is strikingly illustrated by the fact that 1877, which was cold, damp and rainy, but besprinkled with quiet, warm days, was not less productive of observations than the preceding summer, when, for weeks together, there was scarcely a cloud overhead. So while one day there may not be an insect visible, the next may witness them in such abundance that, as the writer expresses it, one could wish for twenty eyes and hands that nothing might escape him.

From a table showing the abundance and activity of the different orders of insects, it appears that in ascending the mountains the relative number of Coleoptera and Hymenoptera decreases, while that of Diptera and Lepidoptera increases. Thus, in the lowlands, of every 100 flower-visiting insects, 15.3 are Coleoptera, and 30 Diptera, while 43.6 are Hymenoptera, and but 9.3 Lepidoptera; but above the timber line, with 6.8 per cent. of Coleoptera, we have 43.6 per cent. Diptera, and with 18.3 per cent. of Hymenoptera, 30.7 per cent. of Lepidoptera. This renders intelligible the great abundance of narrow and partly-closed flowers, and of those which, like many species of *Saxifraga* and *Veronica*, are especially attractive to *Syrphidae* and other Diptera; whereas, without a knowledge of the relative distribution of the flower-frequenting insects it would be a hopeless riddle.

The author has followed the excellent plan, adopted in his earlier book, of compiling a systematic index to the insects observed, connecting with each species the flower it frequents and the degree of their adaptive development. It is to be regretted, however, that, in the alphabetical index to the plants observed, he refers only to the page on which their flowers are described and their visitors noted, and not to the places where they receive mention in the chapters devoted to generalization and conclusions, since numerous biological notes of value occur in these latter places.

Cambridge, Mass., Jan. 11, 1881.

WILLIAM TRELEASE.

§ 15. **The Preservation of Pileate Fungi for the Herbarium.**—As well known to those who have studied the Fungi and have had some experience in attempting to preserve them for purposes of future reference, the most difficult kinds to manage are the fleshy pileate species commonly called "toadstools." A great number of experiments have been made from time to time with a view to discover some plan by means of which the forms and colors of these short-lived plants might, like those of other cryptogams and the phaenogams, be retained for an indefinite period; but the results attained thus far have not proved in all respects satisfactory. In 1794, Dr. William Withering communicated to the *Transactions* of the Linnaean Society (Vol. ii., p. 263) a paper entitled "A new Method of Preserving Fungi," and in which he recommends that the specimen be immersed temporarily in a "pickle" consisting of an aqueous solution of sulphate of copper or of acetate of zinc, and afterwards be permanently kept in hermetically-sealed glass jars filled with water mixed with a small percentage of alcohol. In the first volume of

his *Arrangement of British Plants*, this author gives us an improvement on his original recipe, based on further experimentation, but the materials employed are the same as before. He claims that by his method "fungi may be preserved pretty well." Since Dr. Withering's time various other solutions of chemicals, such as those of sulphate of zinc, chloride of sodium, sulphite of sodium, salicylic acid, etc., as well as various liquids other than alcohol, such as glycerine, petroleum, benzine, etc., have been tried and recommended for a like purpose, only to be finally abandoned as worthless. A good liquid preservative of the higher fleshy fungi still remains a *desideratum*. Another method of preserving these plants is described in a work* by Lüdersdorf, whose plan, very briefly stated, is to slightly dry the toadstool and then immerse it in melted mutton-suet at a temperature of from 125° to 130° F. After the tissues of the fungus have been thoroughly permeated by the fat, the specimen when hard is mounted on a pedestal and kept under a glass shade or in a case. The author claims that "fungi prepared in this manner preserve the exact shape and color of the living individual"; but Dr. Klotzsch (Hooker's *Botanical Miscellany*, Vol. ii.) denies this statement *in toto*. No better results, either, seem to have followed the plan of first immersing the fungus in alcohol and then in "soluble glass" (silicate of potash or soda). The specimen thus prepared becomes almost as hard as stone and speedily loses its color, whatever be the care exercised by the operator. The only person who appears to have successfully solved the problem of preserving fungi with the exact form and color that they possessed in a living state is Mr. J. English, a naturalist at Epping, England. The specimens prepared by this gentleman are said to preserve their original characteristics and natural size perfectly, and have received the approval of Dr. Hooker and other distinguished botanists. As Mr. English prepares his specimens for sale he has deemed it prudent to withhold the secret of his method of operating, and all that is known about it is contained in a short note by him in the *Transactions* of the Botanical Society of Edinburgh, and in which he merely states that the fungi are preserved by *waxing* them.

However successful may be any mode, such as the foregoing, of preparing fungi, it is obvious that specimens so preserved are fit only for the purposes of museums or other establishments where a large amount of space is available for displaying them; and for this reason the ordinary mycologist finds himself obliged to have recourse to the simple method employed for other plants—that of drying them for the herbarium. The most satisfactory mode of making good herbarium specimens of the fleshy *Agaricini* and *Boleti* is the oft-quoted one pointed out by Lasch in *Linnaea*, Vol. v., 1830, and by Klotzsch in Hooker's *Botanical Miscellany*, Vol. ii., 1831. This method, in the form left by its authors, yields very fair results in a goodly number of cases, while in some it proves a total failure. After eight years of experimentation, however, Herr G. Herpell, of St. Goar, has finally

**Das Aufrocknen der Pflanzen fürs Herbarium und die Aufbewahrung der Pilze nach einer Methode, wodurch jenen ihre Farbe, diesen ausserdem auch ihre Gestalt erhalten wird.* Berlin, 1827.

succeeded in so modifying this method that the prepared fungi exhibit and retain for an indefinite period the size, form, color and all other essential characteristics of the living plant; and, carrying his experiments still further, he has discovered a method of fixing the fallen spores durably on paper so that collectively they form a perfect negative of the gills in the case of an Agaric or of the pores in the case of a Boletus, and exactly imitate a fine engraving. European mycologists who have seen these preparations state that the specimens, from every point of view, leave little to be desired. The full details of this new process were generously made known by its author last year in a paper read before a German scientific society, and were afterwards published in its proceedings.* A copy of this publication having come into my hands, I propose in subsequent numbers of the BULLETIN to publish a translation (perhaps somewhat condensed) of Herr Herpell's paper for the benefit of those who may not have access to the original. Having, with these few preliminary remarks, introduced the author, I shall hereafter allow him to speak for himself.

W. R. G.

§ 16. Contributions toward a List of the State and Local Floras of the United States.

II. THE MIDDLE STATES.

Flora of the Northern and Middle Sections of the United States, north of Virginia. By John Torrey, M.D. (D.)

1 vol. 8vo. Albany, 1819.

Compendium of the Flora of the Northern and Middle States; containing generic and specific descriptions of all the Plants, exclusive of the Cryptogamia, hitherto found in the United States north of the Potomac. By John Torrey, M.D. (D.)

12mo, pp. 403. New York, 1826.

Botany of the Northern and Middle States, north of Virginia. By L. C. Beck, M.D. (D.)

12mo, pp. 471. Albany, 1833.

Musci Appalachian; tickets of specimens of Mosses collected mostly in the Eastern part of North America. By C. F. Austin. (C.)

8 vo, pamph. pp. 92 (Supplement I, 16 pp.) Closter, 1870.

NEW YORK.

Catalogue of Plants indigenous to the State of New York. By Jacob Green. (A.)

In Trans. Soc. Promot. Useful Arts. Albany, 1814.

Catalogue of the Medicinal Plants, indigenous and exotic, growing in the State of New York. By Charles A. Lee, M.D.

8vo, pamph. pp. 64. New York, 1840.

Catalogue of the Plants of the State of New York, of which specimens are preserved in the Cabinet at Albany. By John Torrey, M.D. (A.)

In 2d Ann. Rep. of Regents on Cabinet. Albany, 1849.

Catalogue of Plants indigenous to the State of New York. (Ranunculaceae to Melastomaceae). By John Torrey, M.D. (B.)

**Verhandlung des naturhistorischen Vereins der preussischen Rheinlande und Westfalens*. IV Folge. 7 Jahrgang. Bonn, 1880.